

On Page 17, please amend paragraph 5 as follows:

The diffractive-based laser scanning system 100' of the present invention may also be a planar laser illumination module having diffractive optical elements for focusing and shaping of laser light beams to produce a substantially planar illumination beam that is swept through a scanning region adjacent thereto. An example of such a module is described in detail in co-pending U.S. Application No. 09/721,885, filed 11/24/2000 (~~Attorney Reference 108-087USA000~~), co-pending Application No. [] 09/780,027, filed 2/09/2001 (~~entitled "Method and System for Producing Images of Objects Using Planar Laser Illumination Beams ...", Attorney Reference 108-098USA000~~), and co-pending Application No. [] 09/781,665, filed 2/12/2001 (~~entitled "Method and System for Acquiring and Analyzing Information About Physical Attributes of Objects Using Planar Laser Illumination Beams ...", Attorney Reference 108-103USA000~~), all commonly assigned to the assignee of the present invention and herein incorporated by reference in their entirety.

On Page 15, amend the last paragraph as follows:

In addition, the holographic laser scanning system 100-A preferably includes a control board (not shown) disposed with the housing 140 onto which is mounted a number of components mounted on a small PC board, namely: a programmed controller with a system bus and associated program and data storage memory, for controlling the system operation of the holographic laser scanner system 1090A and performing other auxiliary functions; serial data channels (for example, RS-232 channels) for receiving serial data input from the symbol decoding circuitry described above; an input/output (I/O) interface circuit 248 for interfacing with and transmitting symbol character data and other information to an I/O subsystem (which may be operably coupled to a data management computer system); home pulse detector, including a photodetector and associated circuitry, for detecting the home pulse generated when the laser beam from a VLD (in home pulse marking sensing module) is directed through home-pulse gap 260 (for example, between Facets Nos. 6 and 7 on the scanning disk 130 as shown in Fig. 5(D)) and sensed by the photodetector; and a home-offset-pulse (HOP) generator, which is preferably realized as an ASIC chip, for generating a set of home-offset pulses (HOPs) in response to the detection of each home pulse by the home pulse detector. The programmed

controller produces motor control signals, and laser control signals during system operation that enable motor drive circuitry to drive the scanning disc motor coupled to holographic scanning disc 130 and enable the laser drive circuitry to drive the VLDs of the laser beam production modules 247A, 247B, ... 247E, respectively. A more detailed description of the control board and its respective components are disclosed in co-pending U.S. Patent Application 09/047,146 filed 3/24/98 (~~Attorney Docket No. 108-025USA000~~), co-pending U.S. Patent Application 09/157,778, filed 9/21/98 (~~Attorney Docket No. 108-035USA000~~), co-pending U.S. Patent Application 09/327,756 filed 6/7/99 (~~Attorney Docket No. 108-068USA000~~), co-pending U.S. Patent Application 09/551,887 filed 4/18/2000 (~~Attorney Docket No. 108-047USA000~~), International Application No. PCT/US99/06505 filed 3/24/1999 (~~Attorney Docket No. 108-059PCT000~~), and International Application PCT/US00/15624, filed 6/7/2000 (~~Attorney Docket No. 108-085PCT000~~), all commonly assigned to the assignee of the present invention and herein incorporated by reference in their entirety.

On Page 16, amend the third and fourth paragraphs as follows:

The first electrical signal 112A generated by the photodetector 111A is supplied to signal processing circuitry 113A, which is preferably realized as integrated circuits mounted on the PC board 202A as shown. The signal processing circuitry 113A generates a mode switching signal 114A representing change in characteristic wavelength of the laser light beam emitted from the VLD 101A based upon the first electrical signal 112A. Preferably, the signal processing circuitry 113A amplifies and filters the first electrical signal 112A in order to improve the signal-to-noise ratio (SNR) of the mode switching signal 114A. A more detailed description of exemplary circuitry for realizing the photodetector 111A and signal processing circuitry 113A is described below with respect to Figs. ~~7(A)~~ 7(A)(i), 7(A)(ii) and (B).

The mode switching signal 114A is supplied to a temperature controller 116A, which is preferably realized as one or more integrated circuits mounted on the PC board 202A as shown, that operates, in conjunction with a temperature control element 118A in thermal contact with the VLD 101A, to adjust temperature of the VLD 101A (if need be) based upon the values of the mode switching signal 114A supplied thereto, to thereby minimize and avoid changes in characteristic wavelength of the laser light beam emitted from the VLD 101A. A more detailed

description of exemplary control routines executed by the temperature controller 116A in adjusting the temperature of the VLD 101A based upon the values of the mode switching signal 114A to thereby minimize and avoid changes in characteristic wavelength of the laser light beam emitted from the VLD 101A are described below with respect to ~~Figs. 8(A)–8(D)~~ Figs. 8(A)–8(D)(iii)(b).

On Page 17, amend the fourth and fifth paragraphs as follows:

Details and alternate embodiments of the exemplary holographic laser scanning system described above may be found in U.S. Patents 6,158,659, 6,085,978, 6,073,846, and 5,984,185, and co-pending U.S. Patent Application 09/047,146 filed 3/24/98 (Attorney Docket No. 108-025USA000), co-pending U.S. Patent Application 09/157,778, filed 9/21/98 (~~Attorney Docket No. 108-035USA000~~), co-pending U.S. Patent Application 09/327,756 filed 6/7/99 (~~Attorney Docket No. 108-068USA000~~), co-pending U.S. Patent Application 09/551,887 filed 4/18/2000 (~~Attorney Docket No. 108-047USA000~~), International Application No. PCT/US99/06505 filed 3/24/1999 (~~Attorney Docket No. 108-059PCT000~~), and International Application PCT/US00/15624, filed 6/7/2000 (~~Attorney Docket No. 108-085PCT000~~), all commonly assigned to the assignee of the present invention and herein incorporated by reference in their entirety.

The diffractive-based laser scanning system 100' of the present invention may also be a planar laser illumination module having diffractive optical elements for focusing and shaping of laser light beams to produce a substantially planar illumination beam that is swept through a scanning region adjacent thereto. An example of such a module is described in detail in co-pending U.S. Application No. 09/721,885, filed 11/24/2000 (~~Attorney Reference 108-087USA000~~), co-pending Application No. 09/780,027, filed 2/09/2001, (~~Attorney Reference 108-098USA000~~), and co-pending Application No. 09/781,665, filed 2/12/2001, (~~Attorney Reference 108-103USA000~~), all commonly assigned to the assignee of the present invention and herein incorporated by reference in their entirety.

On Page 18, amend the fourth and fifth paragraphs as follows:

The holographic LDIP system 100-B further comprises a parabolic light collecting mirror 3375 mounted beneath the holographic scanning disc 3370 for collecting reflected laser light off

a scanned object (e.g. package) and focusing the same through a condenser-type lens 3376 onto a photodetector 3344 (for example, one or more ~~an~~ of avalanche-type photo-diode devices) mounted below the scanning disc 3370, and producing an electrical signal corresponding thereto.

In addition, the holographic LDIP system 100-B includes: signal processing circuitry for processing the produced electrical signal and generating raw digital range data representative of the distance from the holographic scanning element to sampled points along the scanned object (as well as digital scan data representative of any bar code symbol on the scanned surface of the object); and an image processor for preprocessing the raw digital range data to remove background information components, and processing the preprocessed range data so as to extract therefrom information regarding the dimensions (e.g. area, height, length, width, and/or vertices) and other physical attributes of the scanned object and produce data representative thereof as well as the velocity or other image data of the scanned object.

On Page 19, amend the first paragraph as follows:

Many of the details regarding the construction of the LADAR-based imaging, detecting and dimensioning subsystem 3301B are taught in U.S. Patents 6,158,659, 6,085,978, 6,073,846, and 5,984,185, and in co-pending U.S. Patent Application 09/047,146 filed 3/24/98 (~~Attorney Docket No. 108-025USA000~~), co-pending U.S. Patent Application 09/157,778, filed 9/21/98 (~~Attorney Docket No. 108-035USA000~~), co-pending U.S. Patent Application 09/327,756 filed 6/7/99 (~~Attorney Docket No. 108-068USA000~~), ~~),~~ co-pending U.S. Patent Application 09/551,887 filed 4/18/2000 (~~Attorney Docket No. 108-047USA000~~), International Application No. PCT/US99/06505 filed 3/24/1999 (~~Attorney Docket No. 108-059PCT000~~), and International Application PCT/US00/15624, filed 6/7/2000 (~~Attorney Docket No. 108-085PCT000~~), all commonly assigned to the assignee of the present invention and herein incorporated by reference in their entirety.

On Page 20, amend the fourth paragraph as follows:

Details and alternate embodiments of the exemplary holographic LDIP system described above may be found in co-pending U.S. Patent Application 09/327,756 filed 6/7/99 (~~Attorney Docket No. 108-068USA000~~), International Application No. PCT/US99/06505 filed 3/24/1999

(~~Attorney Docket No. 108-059PCT000~~), and International Application PCT/US00/15624, filed 6/7/2000 (~~Attorney Docket No. 108-085PCT000~~), all commonly assigned to the assignee of the present invention and herein incorporated by reference in their entirety.

On Page 21, amend the last paragraph as follows:

The mode switching signal 114-B is supplied to a temperature controller 116-B, which is preferably realized as one or more integrated circuits mounted within the housing 3373 as shown, that operates, in conjunction with a temperature control element 118-B in thermal contact with the VLD 101-B, to adjust temperature of the VLD 101-B (if need be) based upon the values of the mode switching signal 114-B supplied thereto, to thereby minimize and avoid changes in characteristic wavelength of the laser light beam emitted from the VLD 101-B. A more detailed description of exemplary control routines executed by the temperature controller 116-B in adjusting the temperature of the VLD 101-B based upon the values of the mode switching signal 114-B to thereby minimize and avoid changes in characteristic wavelength of the laser light beam emitted from the VLD 101-B are described below with respect to ~~Figs. 8(A)–8(D)~~ Figs. 8(A) – 8(D)(iii)(b).

On Page 22, amend the last paragraph as follows:

Figs. ~~7(A) and (B)~~ 7(A)(i), 7(A)(ii) and 7(B) illustrate exemplary embodiments of the photodetector 111A and signal processing circuitry 113A for detecting mode switching of a laser light source (e.g., VLD) employed in a diffractive-based laser scanning system (for example, the holographic laser scanning system 100A described above). In such a system, the optical detector 111A is preferably aligned to intercept the zeroth diffraction order beam produced by a diffractive optical element employed in the system (for example, produced by the multi-function diffraction grating 57 of the laser production module 147A of the holographic laser scanning system).

On Page 23, amend the first and fourth paragraphs as follows:

As shown in ~~Fig. 7(A)~~ Figs. 7(A)(i) and 7(A)(ii), the optical detector 111A may comprise one or more photo-diodes (three shown - D7, D7A, D7B), which produce an electrical signal indicative of the detected intensity the zeroth diffraction order laser beam emitted from the

diffractive optical element (which is proportional to the wavelength of the laser light beam emitted from the VLD 101A). The output of the photodiodes (i.e., the first electrical signal 112A) is supplied to the signal processing circuitry 113A.

The temperature controller ~~116A~~, 116A, which is preferably realized as a microcontroller mounted on the PC board 202A as shown, operates, in conjunction with a temperature control element 118A in thermal contact with the VLD 101A, to adjust temperature of the VLD 101A (if need be) based upon the levels of the mode switching signal supplied thereto, to thereby minimize and avoid changes in characteristic wavelength of the laser light beam emitted from the VLD 101A. A more detailed description of exemplary control routines executed by the temperature controller 116A in adjusting the temperature of the VLD 101A based upon the values of the mode switching signal to thereby minimize and avoid changes in characteristic wavelength of the laser light beam emitted from the VLD 101A are described below with respect to ~~Figs. 8(A)–8(D)~~ Figs. 8(A) – 8(D)(iii)(b).

On Page 33, amend the fourth and fifth paragraphs as follows:

The temperature controller ~~116A~~, 116A, operates, in conjunction with a temperature control element 118A in thermal contact with the VLD 101A, to adjust temperature of the VLD 101A (if need be) based upon the levels of the digital mode switching signal supplied thereto, to thereby minimize and avoid changes in characteristic wavelength of the laser light beam emitted from the VLD 101A. A more detailed description of exemplary control routines executed by the temperature controller 116A in adjusting the temperature of the VLD 101A based upon the values of the mode switching signal to thereby minimize and avoid changes in characteristic wavelength of the laser light beam emitted from the VLD 101A ~~are~~ is described below with respect to ~~Figs. 8(A)–8(D)~~ Figs. 8(A) – 8(D)(iii)(b).

~~Figs. 8(A)–8(D)~~ Figs. 8(A) – 8(D)(iii)(b) illustrate exemplary control routines executed by the temperature controller 116A in adjusting the temperature of the VLD 101A based upon the values of the mode switching signal supplied thereto, to thereby minimize and avoid changes in characteristic wavelength of the laser light beam emitted from the VLD 101A. Any one of these control routines, when used, is preferably stored as a programmed sequence of instructions in the memory space of the temperature controller 116A and loaded therefrom for execution by

the processor of the temperature controller 116A. In these control routines, a digital mode switching signal (or flag) is derived from the mode switching signal(s) generated by the signal processing circuitry 113 and indicates that mode switching (i.e., a change in characteristic wavelength) occurred during the last sampling period (for example, set to a logic level 1 as described above).

On Page 25, amend the first paragraph as follows:

Fig. 8(A), which includes two drawing sheets 8(A)(i) and 8(A)(ii), is ~~psuedo-code~~ pseudo-code describing a first illustrative embodiment of the control routine executed by the temperature controller 116A in adjusting the temperature of the VLD 101A. In this illustrative embodiment, the temperature controller 116A controls the temperature of the VLD 101A by varying the pulse width (i.e., duty cycle) of a pulse width modulated signal output via an I/O port of the temperature controller 116A, which controls the pulse width (i.e., duty cycle) of a pulse width modulated power signal supplied to a heating resistor placed in thermal contact with the VLD 101A.

On Page 27, amend the last paragraph as follows:

Fig. 8(B) is ~~psuedo-code~~ pseudo-code describing a second illustrative embodiment of the control routine executed by the temperature controller 116A in adjusting the temperature of the VLD 101A. The operation is similar to the control routine of FIG. 8(A), except that that the current power level (i.e., the value of the pulse width modulated control signal) is used to determine whether to perform the heat loop or cool loop in adjusting the temperature of the VLD 101A to bring it out of mode switching operation. More specifically, in the event that mode switching is detected (step 20), the operation continues to step 30 to determine if the current power level is in the lower half (or upper half) of the temperature control range. If in the lower half of the temperature control range, the heat loop (steps 40-160) is performed. If in the upper half of the temperature control range, the cool loop (steps 175 - 275) is performed.